APPS
WIDGETS
ProxyMITY
Clicker
ProxyMITY Wi-Fi
Blender Animations
Robot
C
C++
Python
Scilab
Educational Content
AAKASH
tablet for every indian
APPLICATION MANUAL

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1) Introduction to Aakash Applications

Your Aakash is an Android 4.0 tablet which has preloaded applications like Clock, Alarm, Calendar, etc.. Apart from the standard applications available, IIT Bombay has developed and loaded some extra. These applications are useful for students, teachers, and any individual who is inclined towards learning.

The applications are classified into two groups: the Aakash Application and Aakash Programming lab, listed below.

- Aakash Applications:
  - Clicker
  - Proxymity
  - Robot Controller
- Aakash Programming Lab:
  - C
  - C++
  - Python
  - Scilab

Application Manual Version 1.1 - October 2012

1.1) Home Screen

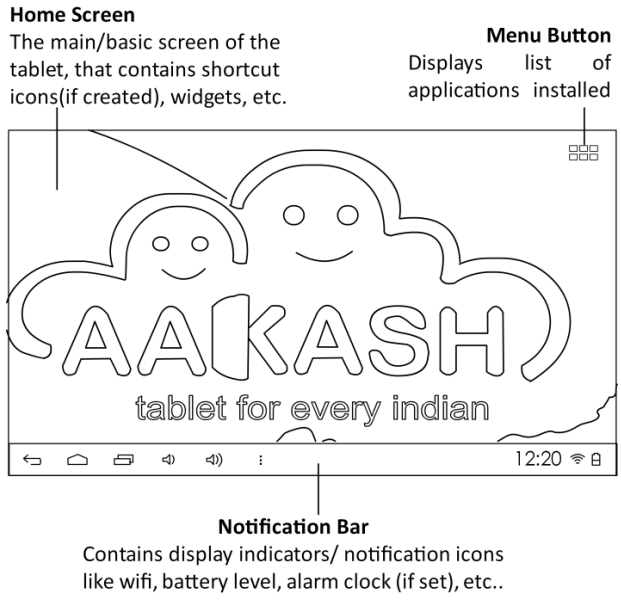

Home Screen
The main/basic screen of the tablet, that contains shortcut icons(if created), widgets, etc.
Menu Button
Displays list of applications installed
AAKASH
tablet for every indian
12:20
Notification Bar
Contains display indicators/ notification icons like wifi, battery level, alarm clock (if set), etc..

Fig 1

1.2) Display Indicators

The display indicators are present in the notification bar placed at the bottom (Fig 1) of the screen.

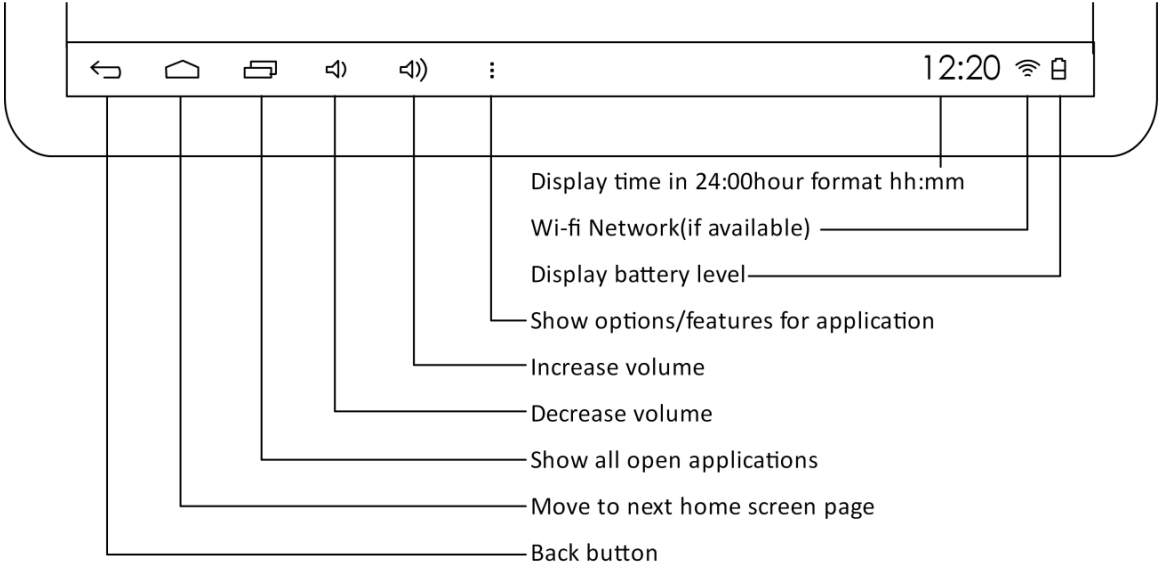


Fig 2

2) Aakash Applications

Touch Menu button on the home screen and browse through the list of applications.

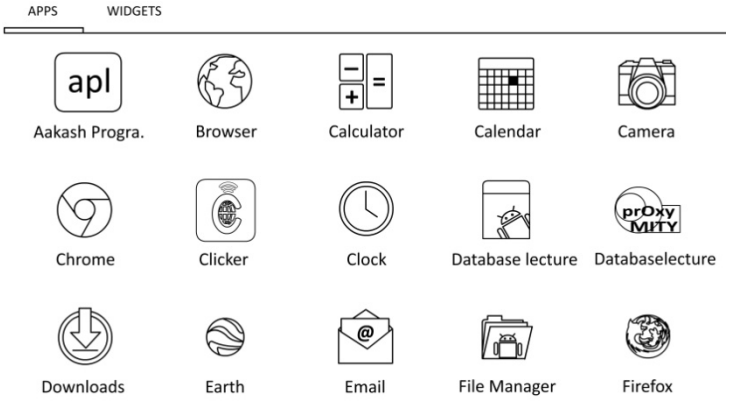


Fig 3

Touch Aakash Applications

Fig 4

This will display Aakash Applications.

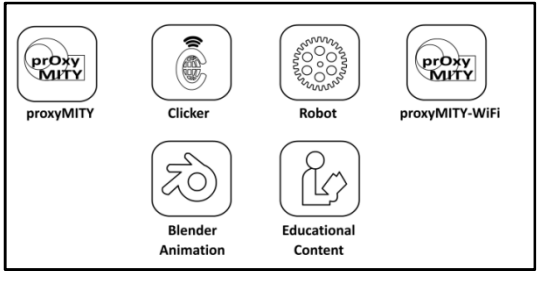


Fig 5

2.1) Clicker

In a classroom environment, interaction between instructor and participants is the most crucial factor for effective learning. Clicker devices are used to collect instant feedback from a large number of students, either as a response to a question, or to a quiz. IIT Bombay had developed a low cost clicker device, and a complete system which was used for conducting quizzes. This application system has been successfully ported on Aakash. Clicker response collection is now available through a web based interface.

Since Aakash is more powerful than an ordinary clicker device, several useful features have been added. A quiz question now gets fully downloaded on individual student's Aakash tablet, through Wi-Fi. A multiple question test can now be conducted. All the questions of such a test are downloaded on the student tablet. Time control is maintained by Aakash. At the end of the test time, all answers are automatically collected, and individual scores get recorded in the back-end system.

Note:- This application can run only when the complete software is working on the back-end server, which can connect to the Aakash tablets with students using Wi-Fi.

Touch Clicker

Fig 6

Clicker application screen is displayed that contains text field, where Tablet ID and IP are to be entered. Tablet ID is a number located on the back side of the tablet.

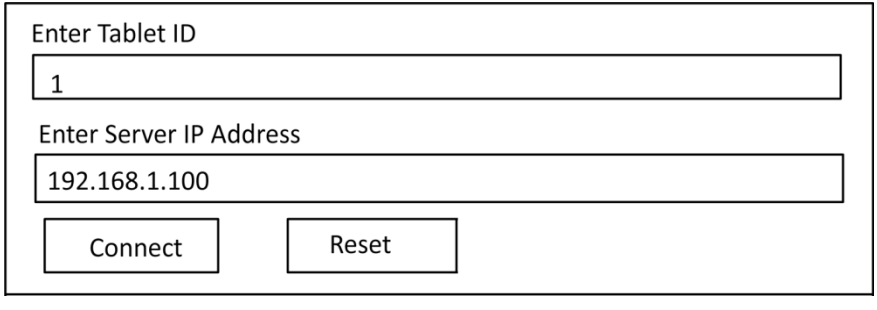


Fig 7

2.1.1) Selecting Course

Select Course from dropdown list. (Ex- CSE101)

Touch Set Course button.

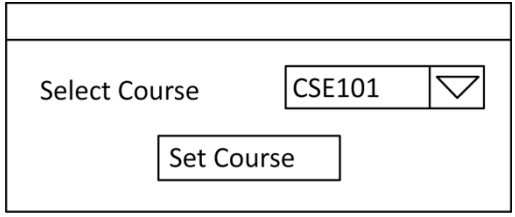


Fig 8

A welcome screen is displayed.

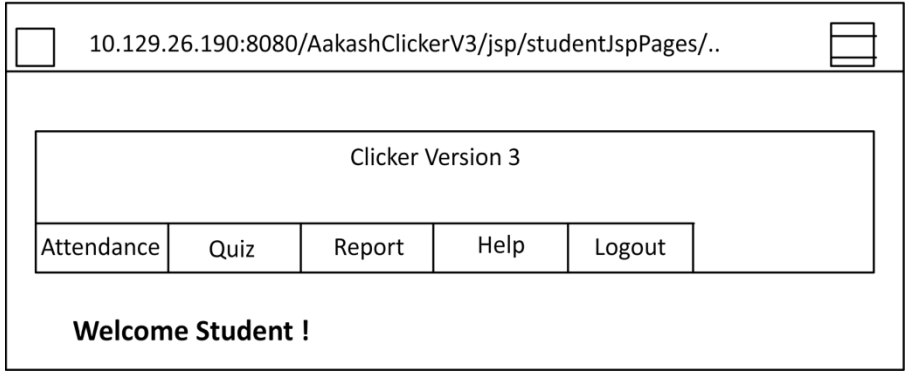


Fig 9

2.1.2) Attendance

Touch Attendance tab for submitting attendance.

Touch Attendance button for submitting attendance.

The instructor initiates the attendance. A message "Attendance not taken, Please try later" is displayed if the instructor has not initiated.

When the instructor initiates, a countdown timer is displayed on the tablet screen.

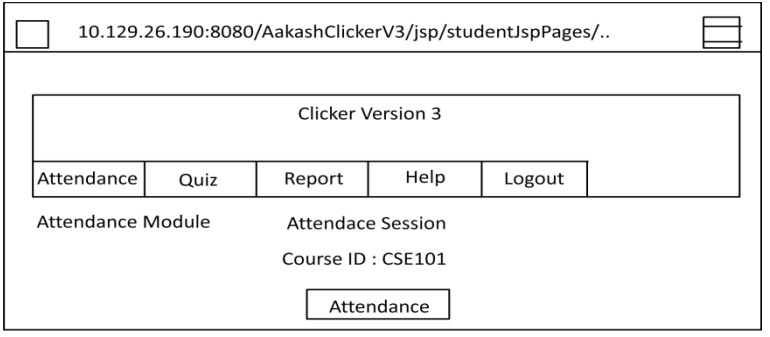


Fig 10

Touch Submit Attendance button.

A dialog box appears after attendance is submitted.

Touch Ok button.

"Attendance Taken" message appears on the screen after attendance is submitted.

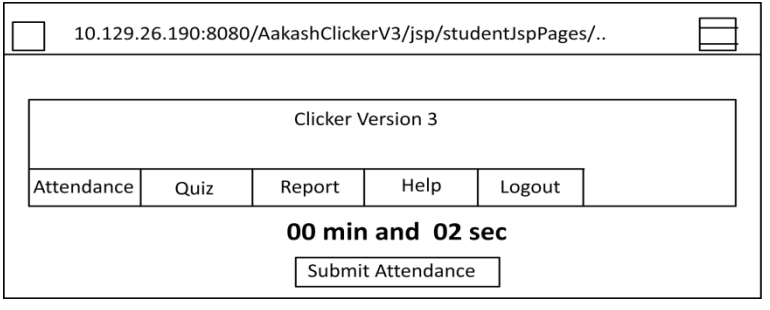


Fig 11

2.1.3) Quiz

Touch Quiz tab

"Waiting for quiz" message appears on the screen.

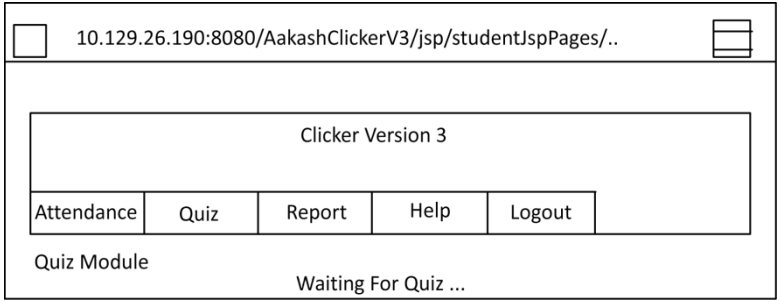


Fig 12

Questions are displayed on the tablet screen after the quiz is launched by the instructor.

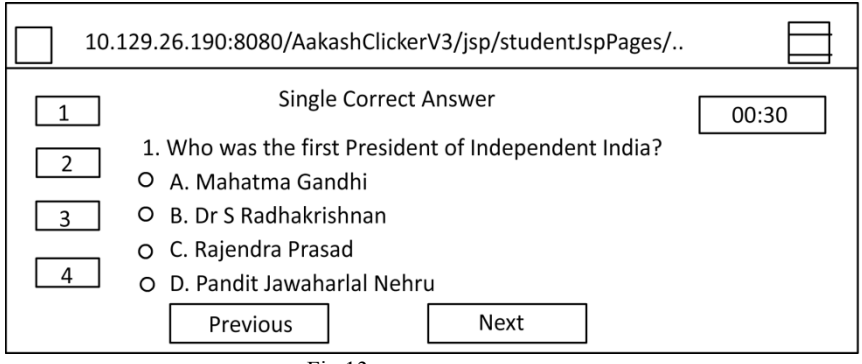


Fig 13

2.1.4) Navigating Questions

Touch Previous to view the previous question

Touch Next to view the next question

Touch the respective buttons, placed on the left to navigate to a particular question.

2.1.5) Answering quiz

Touch the corresponding radio buttons (options for the question). Quiz will end automatically after some stipulated time decided by the instructor.

A message stating “Your Response has been successfully received” message.

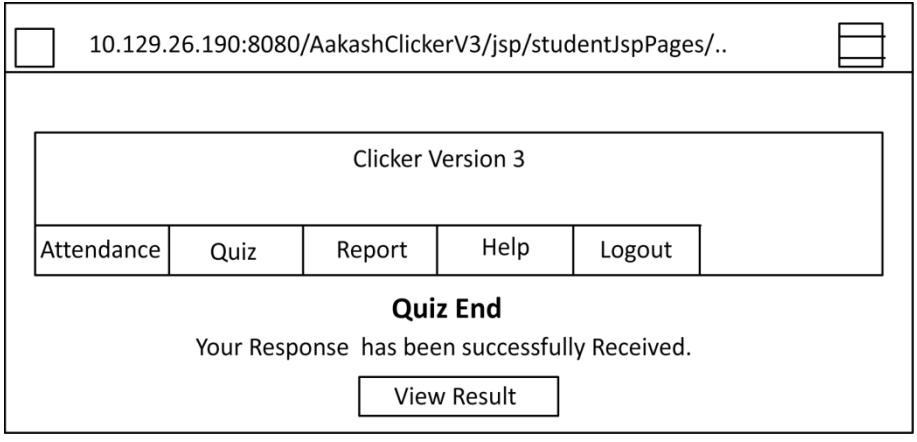


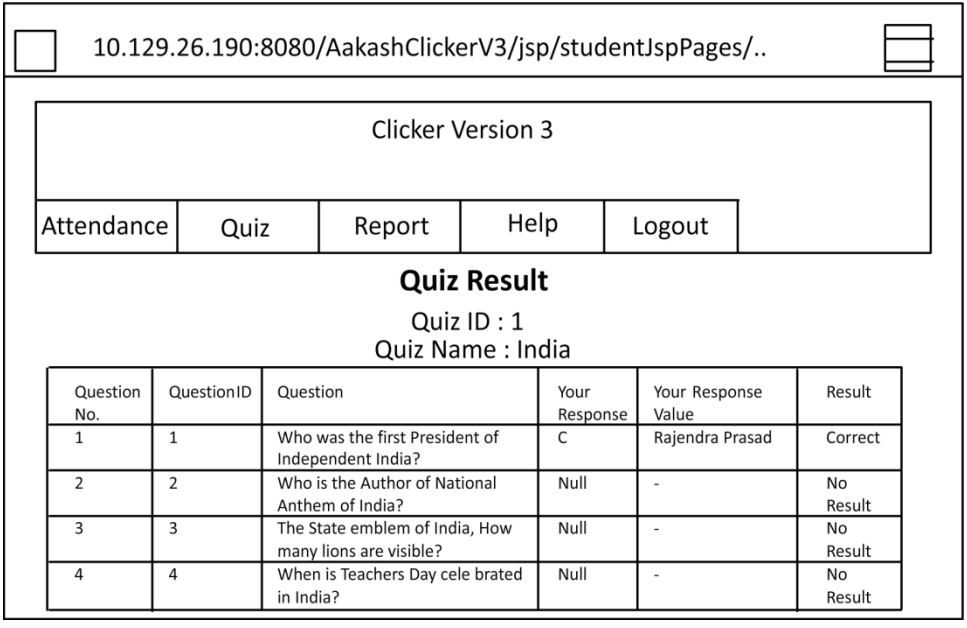
Fig 14

2.1.6) View current Result

Answer the quiz initiated by the instructor.

Touch View Result button.

The result will be displayed on the screen.



Question No.	QuestionID	Question	Your Response	Your Response Value	Result
1	1	Who was the first President of Independent India?	C	Rajendra Prasad	Correct
2	2	Who is the Author of National Anthem of India?	Null	-	No Result
3	3	The State emblem of India, How many lions are visible?	Null	-	No Result
4	4	When is Teachers Day cele brated in India?	Null	-	No Result

Fig 15

2.1.7) View Student Information

Touch Report tab

Touch Student Information radio option

Student information is displayed on the screen.

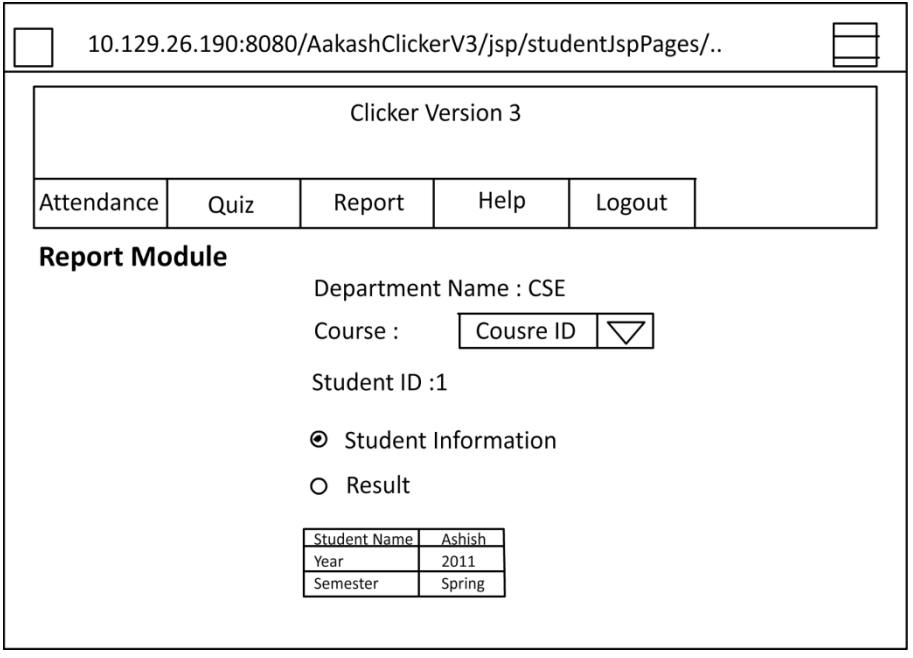


Fig 16

2.1.8) View Reports

Touch Report tab

Touch Course

Touch Course name.
(Ex- CSE101)

Touch Result option.

Touch Student Report button

Student's overall report is displayed.

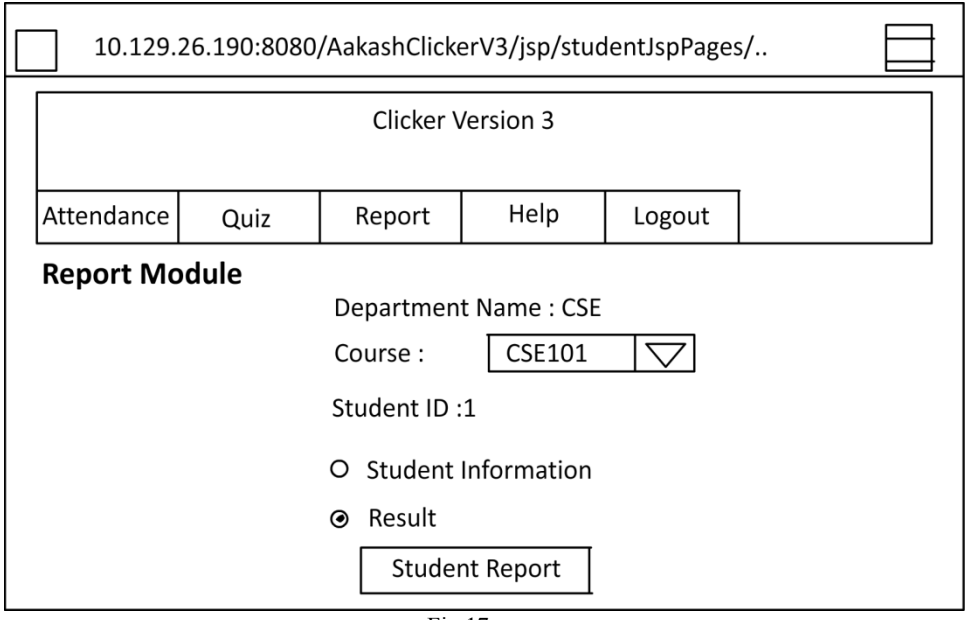


Fig 17

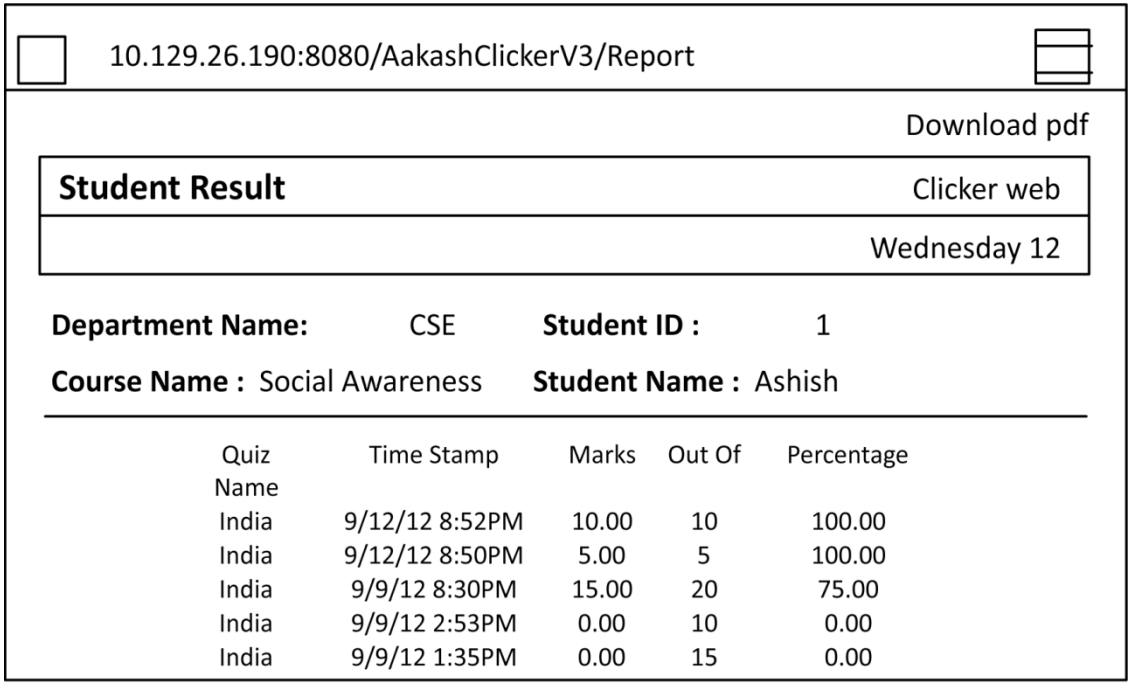

10.129.26.190:8080/AakashClickerV3/Report
Download pdf
Student Result
Clicker web
Wednesday 12
Department Name: CSE
Student ID : 1
Course Name : Social Awareness
Student Name : Ashish
Quiz Name | Time Stamp | Marks | Out Of | Percentage
India | 9/12/12 8:52PM | 10.00 | 10 | 100.00
India | 9/12/12 8:50PM | 5.00 | 5 | 100.00
India | 9/9/12 8:30PM | 15.00 | 20 | 75.00
India | 9/9/12 2:53PM | 0.00 | 10 | 0.00
India | 9/9/12 1:35PM | 0.00 | 15 | 0.00

Fig 18

2.1.9) Help menu

Touch Help tab

User manual is displayed.

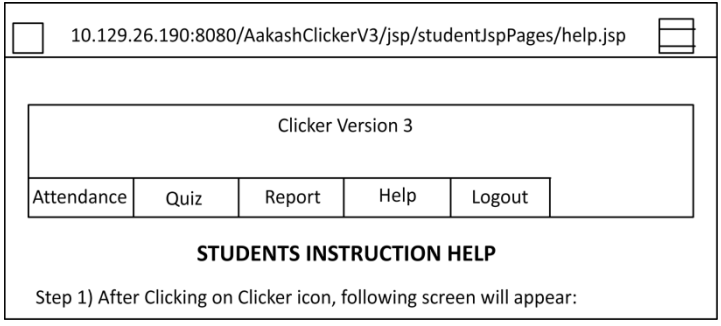


Fig 19

2.1.10) Logout

Touch Logout tab to exit the application.

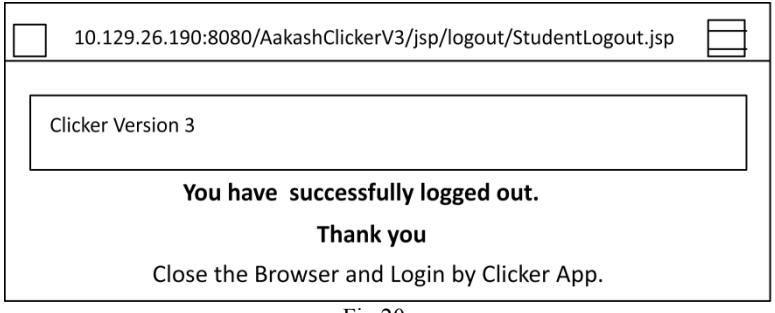


Fig 20

2.2) Proxymity

2.2.1) Introduction

ProxyMITY is a tool developed at IIT Bombay, which enables creation of interactive lessons, by importing lecture video and presentation slides. The name stands for Proxy Multimedia.

Integration Tool for You. In any lecture, Presentation slides which fall under a single topic are grouped together as part of a 'Theme', which is a searchable attribute. The presentation slides are then synchronized with the lecture video, on a chosen timeline. The entire lesson is published in the form of either a desktop standalone application, or as html content to be viewed within a web browser. Students are able to view the published lessons, and can navigate to specific topics. The lessons are distributed in Open Source, under the Creative Commons license.

An application has been developed for accessing these lessons on Aakash tablets. Students get individual access to quality lectures of reputed teachers, for effective personalized learning. They have the flexibility of studying anytime, anywhere, and at their own pace. A searchable database storage and retrieval system for students, that enables fast access to relevant lessons, is being developed.

2.2.2) Loading SD Card

Insert the pen drive or SD card in the slot provided on the tablet. Refer the basic manual for inserting the SD card.

Wait for 10 seconds for the pen drive or SD card to be detected by the tablet.

A message stating "Preparing SD Card" will be displayed in the notification bar. This means the pendrive or SD card is ready for use.

2.2.3) Selecting a Wi-fi Network

Touch Menu button on the home screen		
Touch Settings		Fig 21
Touch Wi-Fi		Fig 22
Touch "OFF" to switch on Wi-Fi connectivity		Fig 23
The tablet will list all the available W-Fi connections.		

Touch any one of the available Wi-Fi networks

Touch Connect

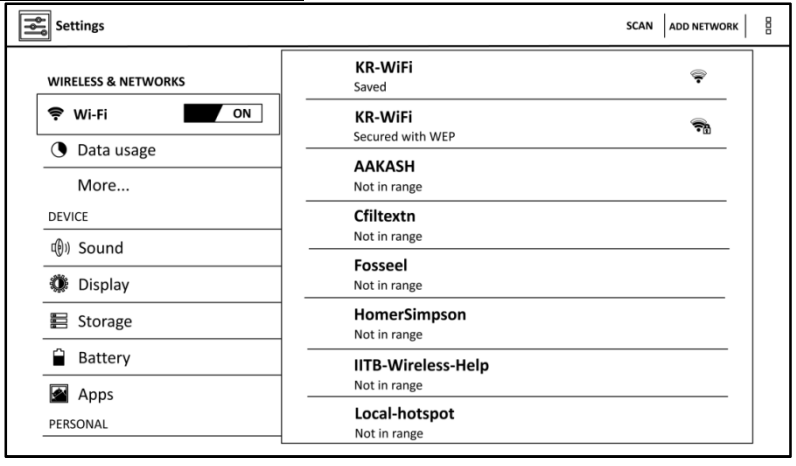


Fig 24

2.2.4) Viewing Lecture from SD Card

Insert the SD Card into the tablet. Refer 2.2.2

Touch proxyMITY

Fig 25

A list of lectures is displayed.

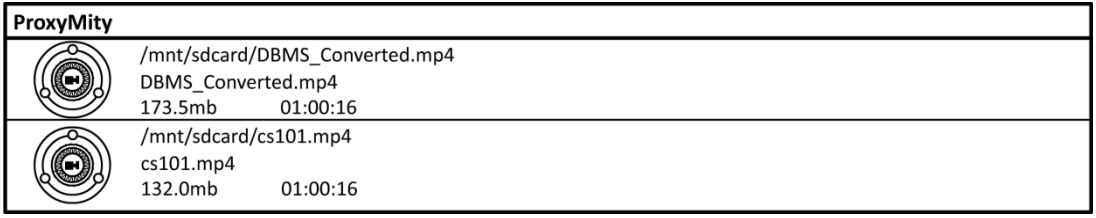


Fig 26

The lectures will be played automatically from SDCard/pendrive. An example video is shown.

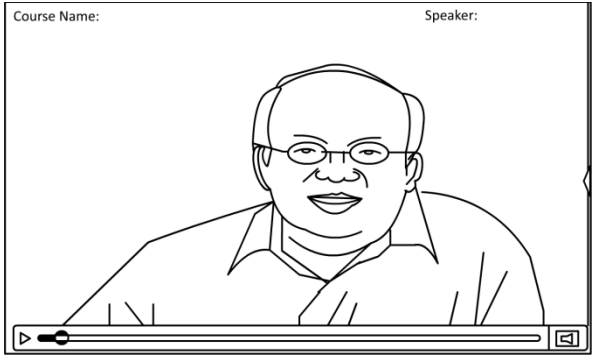


Fig 27

2.2.5) Viewing Lecture using Wifi

Select appropriate Wi-Fi connection. Refer 2.2.3

Touch proximity-Wifi

Fig 28

Touch Options.

Touch Wifi-Settings.

Fig 29

A dialog box .is displayed

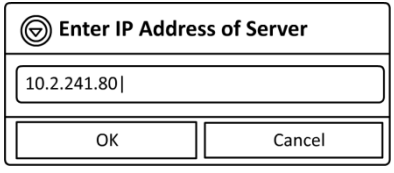


Fig 30

Enter the IP address of the server from where you want to fetch the video lecture.

(eg: *http://10.105.14.224/*)

Touch OK to confirm.

A list of video lectures present on the server is displayed.

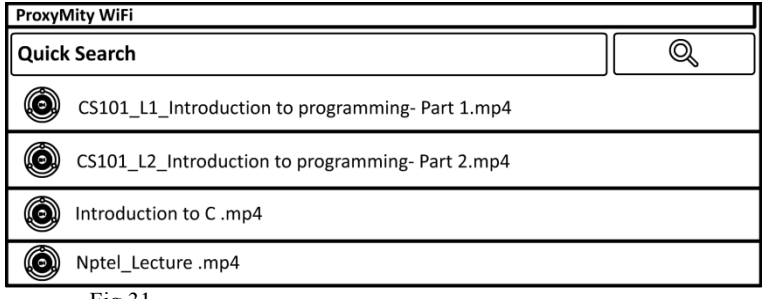


Fig 31

2.2.6) Navigation

To navigate through the video lecture, touch the arrow button placed on the extreme right of the video lecture. Fig 26

A list of topics is displayed on the extreme right.

Touch the desired topic to view.

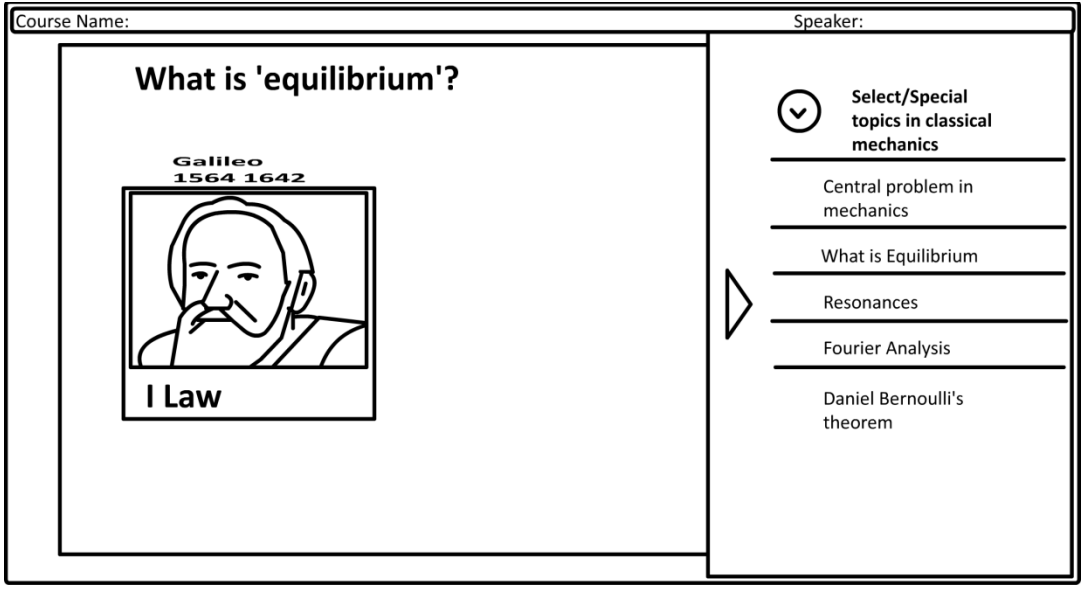


Fig 32

2.2.7) Play video with Subtitles

To play videos with sub titles, touch the Option button while viewing the video. This displays the options that can be performed for the video.

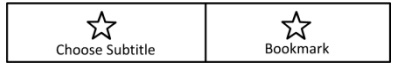


Fig 33

Touch Choose Subtitle.

This will list all ".srt" files which are retrieved from SD-card/pen drive/server(wi-fi).

Touch the desired file.

The video lecture will be played along with subtitles which are displayed at the bottom.

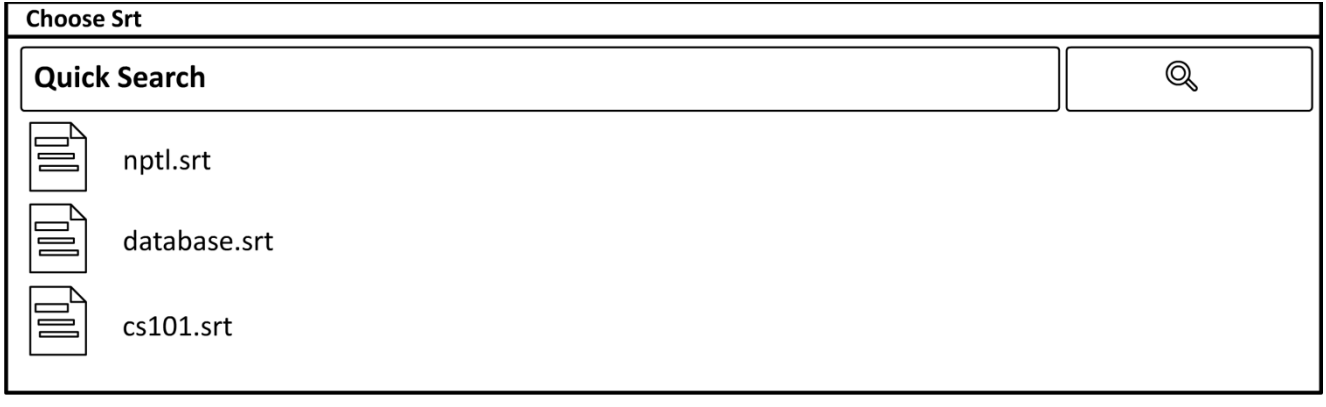


Fig 34

2.2.8) Creating bookmark

To bookmark certain part of the video, touch the Option button while viewing the video. This displays the options that can be performed for the video.

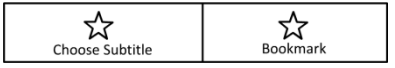


Fig 35

Touch Bookmark.

This displays the fields that need to be entered by the user.

Enter the Video name and Bookmark Tag.

The start time is captured when the Bookmark option is selected.

Touch Add Bookmark button to save.

A message 'Successfully Bookmarked' is displayed.

The bookmark is the saved in 'My Bookmarks' tab.

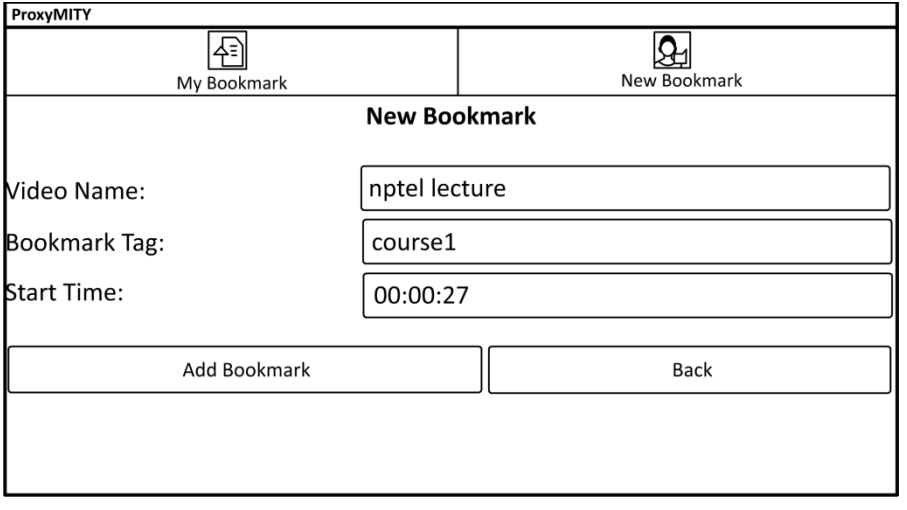


Fig 36

2.2.9) Viewing bookmark

To bookmark certain part of the video, touch the Option button while viewing the video. This displays the options that can be performed for the video.

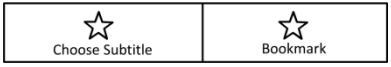


Fig 37

Touch Bookmark. This displays the fields that need to be entered by the user. Touch My Bookmarks, which will display all the bookmarks.

Select the desired bookmark.

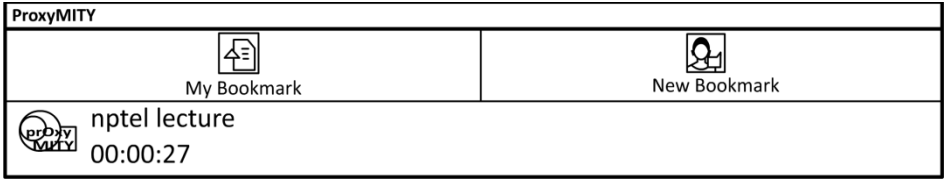


Fig 38

2.2.10) Update/ Delete bookmark

List/View all the bookmarks (Refer 2.2.7)

Touch and hold the desired bookmark for 3 seconds.

Edit the desired details.

Touch Update/Delete

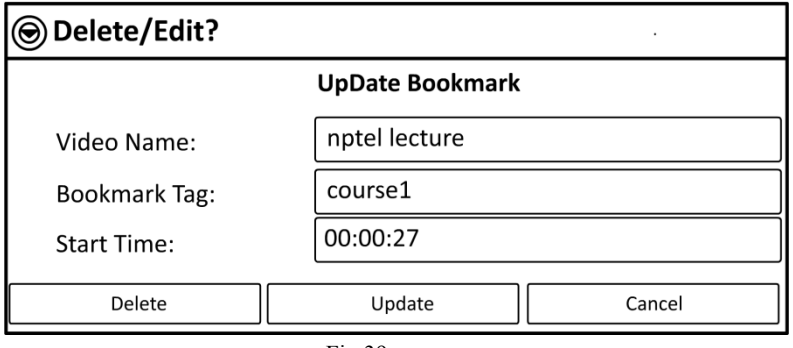


Fig 39

2.3) Robot

2.3.1) FIREBIRD V ROBOT

The Firebird V (ATMEGA2560) is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega2560 achieves throughputs approaching 1 MIPS per MHz allowing the system designer to optimize power consumption versus processing speed.

The goal of 'e-Yantra' project at IIT Bombay, is to create the next generation of (Embedded System) engineers in India who are more practical in their outlook. The project aims at design and deployment of robots, for enhanced teaching of subjects in Engineering Colleges, to provide continued education for teachers for quality improvement in teaching, and to create Open Courseware for Embedded Systems for engineering students, based on robots.

We have developed a Robot-control application which runs on Aakash. A robot with a mounted camera is controlled by the Aakash tablet using a Wi-Fi hot spot. Students can control the movement of the Robot using a simulated touch-controlled joy-stick provided on the tablet. Simultaneously, the video stream captured by the camera mounted on the Robot, is transmitted to Aakash, which can be viewed in a window on the tablet.

Fig 40

2.3.2) Wi-Fi Camera

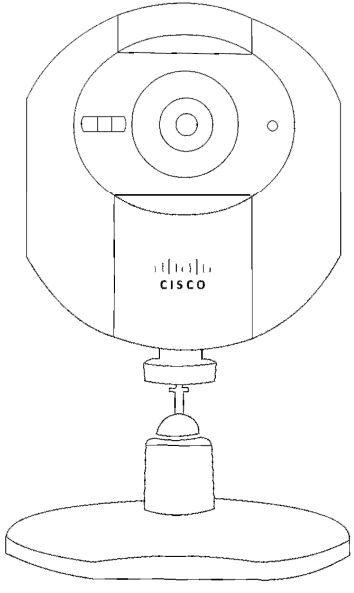


Fig 41(a) Front Panel

CISCO Linksys WVC80N wireless camera is mounted on the robot to get the picture of the surroundings of the robot.

Features:

- Wireless-N (2.4 GHz)
- Delivers high quality audio/video
- No computer needed
- Great for security
- View video on computer, tablet.
- Automated motion detection.

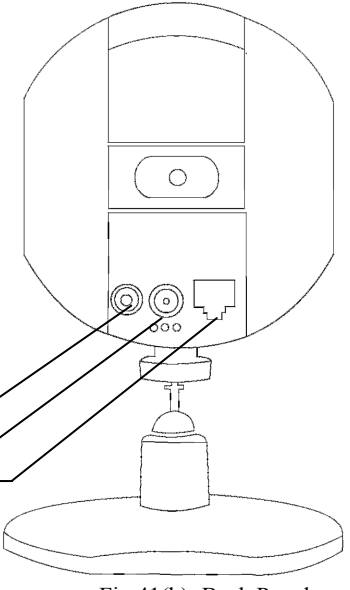


Fig 41(b): Back Panel

2.3.3) Schematic

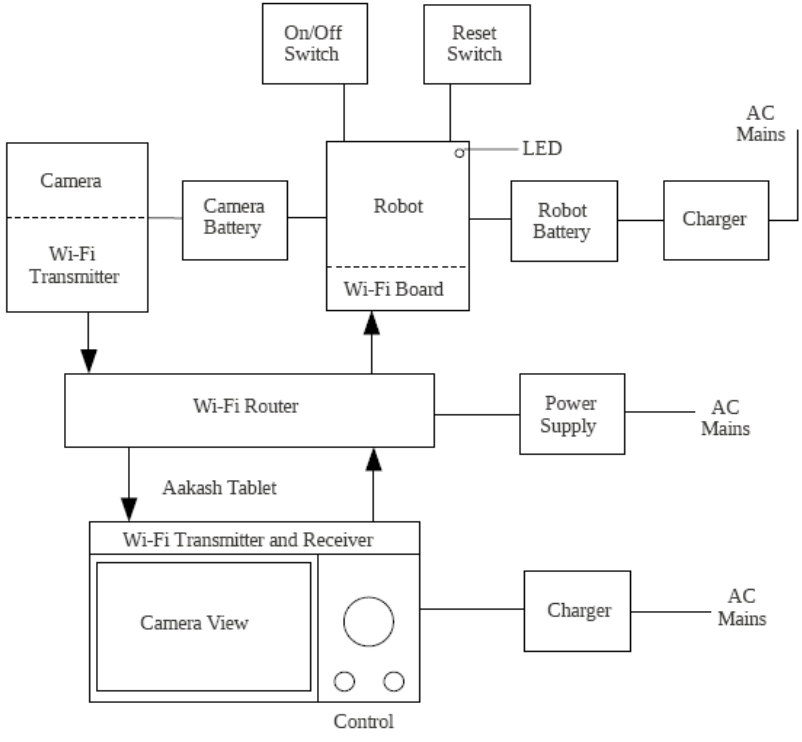
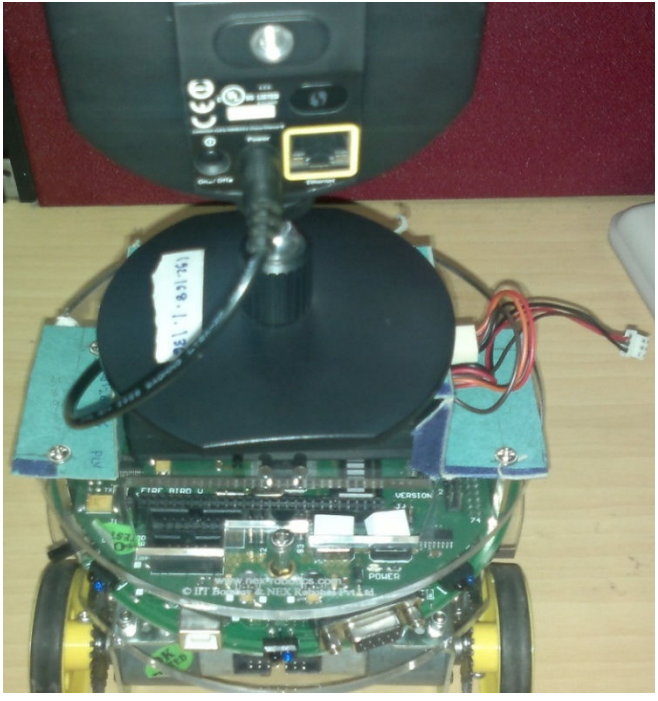


Fig 42: Firebird Robot and Camera Control through Aakash tablet Interconnection Schematic Diagram

2.3.4) Assembly Pictorial

Fig 43: Assembly Pictorial view of the Robot Setup



2.3.5) Charging the Robot:

Turn off the Robot using the switch.

Make sure the FRC cable and power cord is connected to the power board.

Fig 44

Turn on the power supply and you will see a RED LED glowing on the board.

Fig 45

Connect the other end of the FRC connector to the Robot.

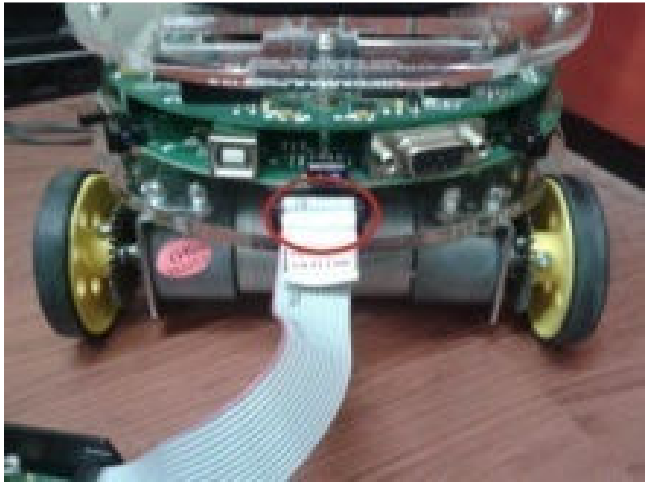


Fig 46

Press the button on the power board and charging will start. It is indicated by a constant glowing GREEN LED. If LED does not glow press the button again.

Fig 47

Alternate blinking of RED and GREEN LEDs shows that the battery is fully charged. Turn off the supply and unplug the power cord.

2.3.6) Charging Battery of Camera-

Connect the battery to the charger as shown below.

Fig 48

Turn on the switch.

Fig 49

Battery starts charging and is indicated by two RED leds glowing. Battery charge completed in indicated by both leds showing GREEN light.

Fig 50

Remove the wire and unplug the charger.

2.3.7) Turning on the camera

Switch on the router (Robot Router).

Connect the power cord of the battery to the camera as shown below

Switch on the power using the switch provided on the battery.

Fig 51

LED starts blinking. Wait till it stops blinking and glows continuously.

Fig 52

2.3.8) Turning on the Robot

Switch ON the robot

If it starts beeping, press the reset button once.

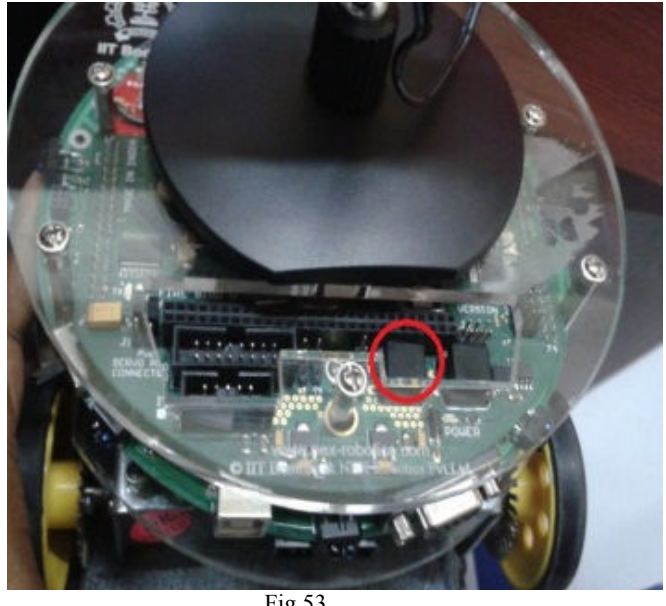


Fig 53

2.3.9) Selecting a Wi-fi Network

Touch Menu button on the home screen		
Touch Settings		Fig 54
Touch Wi-Fi		Fig 55
Touch "OFF" to switch on Wi-Fi connectivity		Fig 56
The tablet will list all the available W-Fi connections.		

Touch any one of the available Wi-Fi networks

Touch Connect

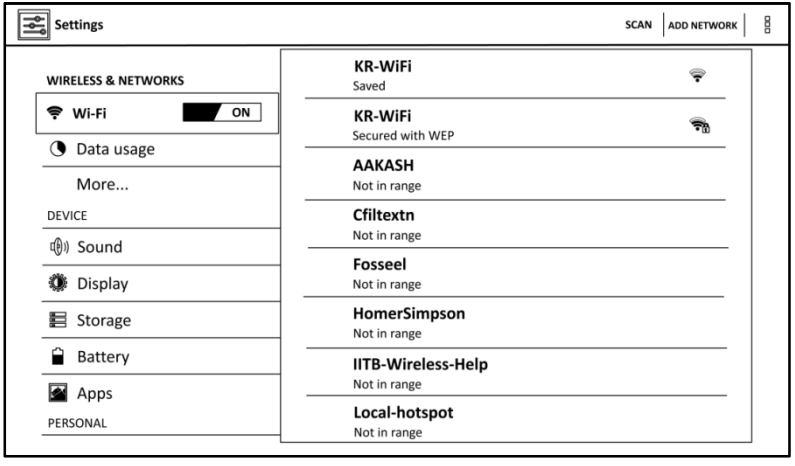


Fig 57

2.3.10) Start Robot Application

Touch Menu button on the home screen and browse through the list of applications.

Touch Aakash Applications

Fig 58

This will display Aakash Applications.

Touch Robot application.

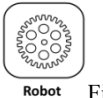


Fig 59

Wait till you get the continuous video streaming.

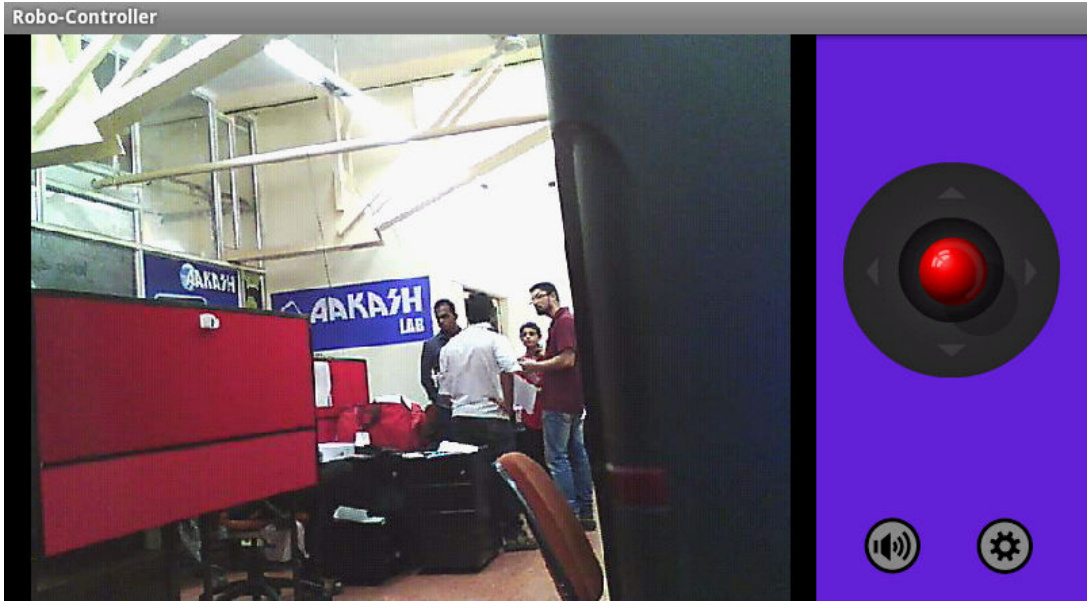


Fig 60

2.3.11) Configuring Robot and Camera

Start Robot Application. Refer 2.3.10

Touch Settings

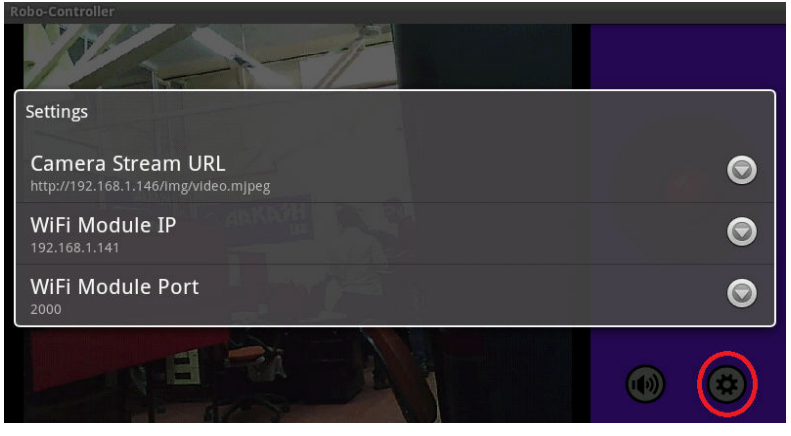


Fig 61

Touch Wi-Fi Module IP

Enter the configured IP Address.

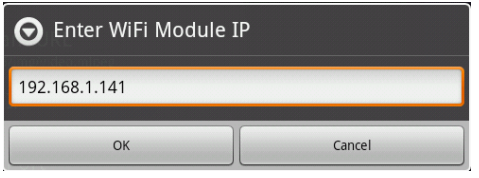


Fig 62

Touch Camera Stream URL

Enter the configured IP Address and URL.

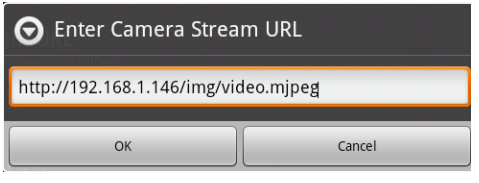


Fig 63

2.4) Blender Animation

Blender is a free and Open Source software product, used for creating animations, rendering, video editing, etc. Under OSCAR project (http://oscar.iitb.ac.in) at IIT Bombay, several educational animations have been developed, all of which are made available in Open Source.

Some of these have been ported to work on Aakash. A few animations for demonstration are loaded on this tablet.

2.5) Educational Content

Apart from displaying text files in various formats, Aakash can play video and audio content. The content can be either on a local Micro SD card storage or on a server accessible through Wi-Fi. A lot of contents are available through efforts such as NPTEL, Spoken Tutorials, Workshop courses, etc. Wikipedia, Gutenberg project, Connexions project at Rice University, and many such global efforts have generated a large pool of knowledge contents in Open Source.

The efforts at IIT Bombay have been to add more such contents for use in Indian education system, to integrate these together in a better usable format, and to make these accessible using Aakash.

This application accesses such contents, located on an SD card, in .pdf, .html, or .mp3 formats.

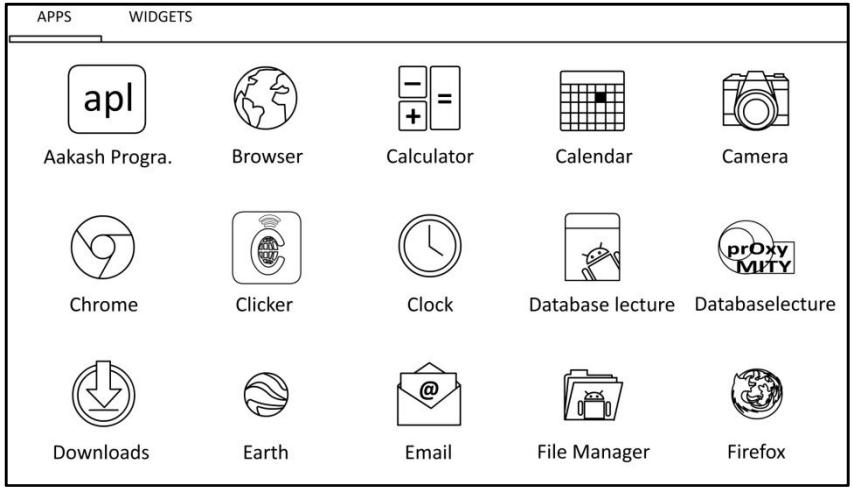


Fig 64

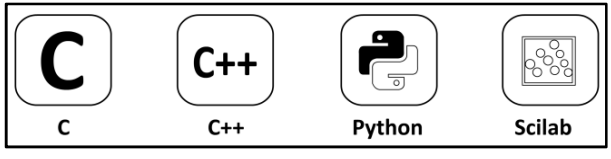


Fig 66

3) Aakash Programming Lab

Touch Menu button on the home screen, and browse through the list of applications.

Touch APL icon

Fig 65

Applications installed under APL, are displayed: C, C++, Python, Scilab

3.1) C Programming

Touch C icon, which will display "C" programming console. This console is common for all four applications.

3.1.1) Text Area and Output Window

The programming console is divided into two parts, Text area(left) for writing codes, and console output(right) for displaying output of the program.

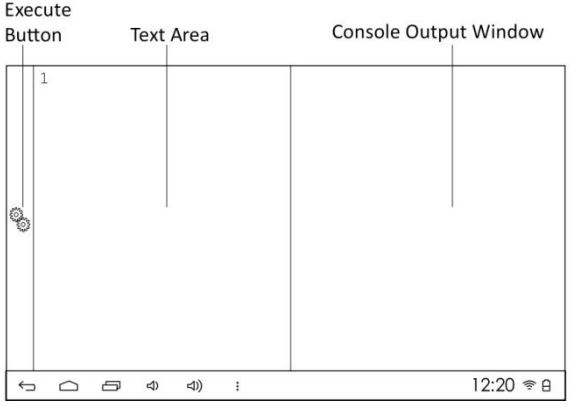


Fig 67

3.1.2) Load Examples

Touch Options button placed in the notification bar. A list of options is displayed.

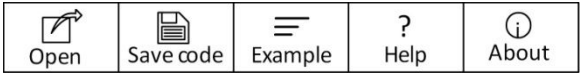


Fig 68

Touch Example Fig 69

A list of preloaded examples is displayed.

Choose your file
dec_to_bin.c
Diamond.c
Pointer.c
Pascal.c

Fig 70

Touch the desired "C" program, e.g. "dec_to_bin.c".

The code is loaded and displayed in the text area.

Slide the text area (up and down) to view more code.

3.1.3) Execute

Write or load existing program.

Touch Execute button placed on the left.

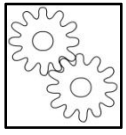


Fig 71

The output is displayed in the console output window.

Type your C code (GCC 4.6.3)

```
1  #include <stdio.h>
2  int main()
3  { printf("Decimal to binary \n");
4   int n,c,k;
5   n=2;
6   printf("%d in binary system :-",n");
7   printf("\n");
8   for (c=15; c>=0; c--)
9   {
10     k=n>>c;
11     if(k & 1)
12        printf("1");
13     else
14        printf("0");
15  }
16  printf("\n");
17  return 0;  }
18
19
```

Console Output

```
Decimal to binary
2 in binary system is:-
0000000000010
```

12:20

Fig 72

3.1.4) Write

Touch the text area to activate the android keyboard.

Refer the “Basic Manual” for operating the android keyboard.

Write the desired code. Touch the back button in the notification bar to minimize the keyboard

Fig 73

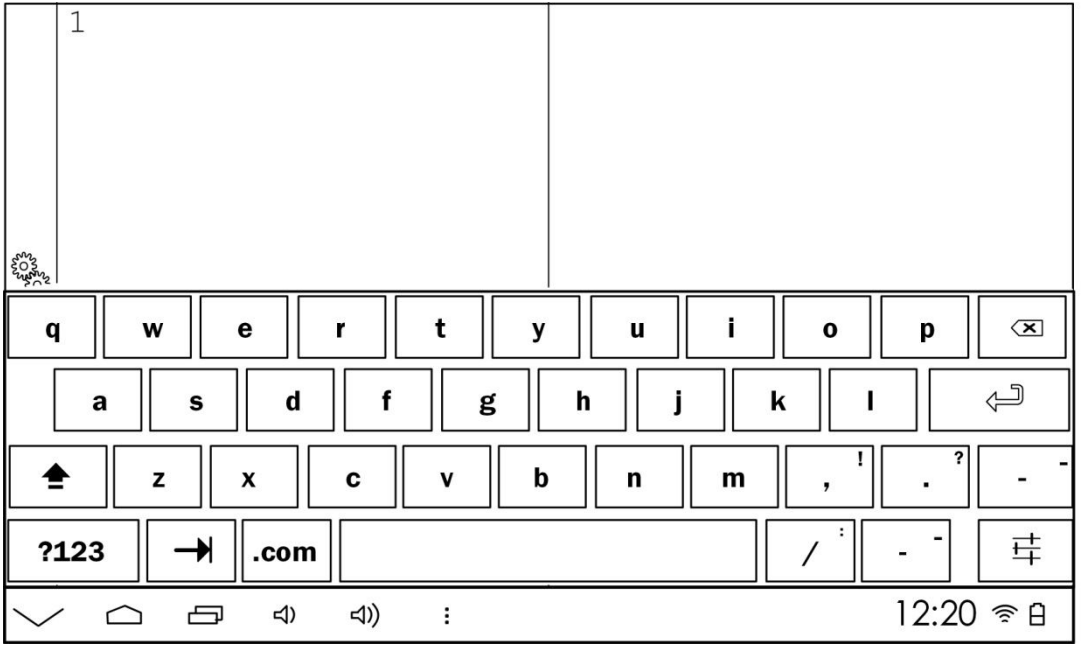


Fig 74

3.1.5) Save

Write the desired code.

Touch Options button placed in the notification bar. A list of options is displayed.

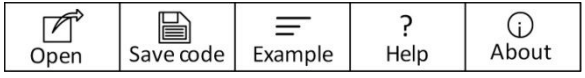


Fig 75

Touch Save Code.

Fig 76

An input box is displayed.

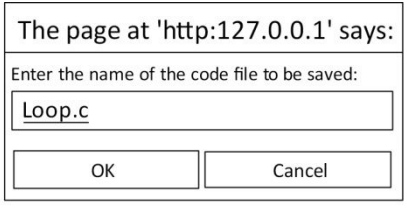


Fig 77

Write the desired name using the android keyboard.

Touch OK

3.1.6) Open

Touch Options button placed in the notification bar. A list of options is displayed.

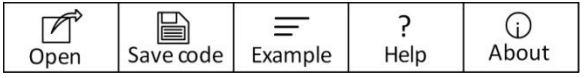


Fig 78

Touch Open

Fig 79

A list of saved programs is displayed.

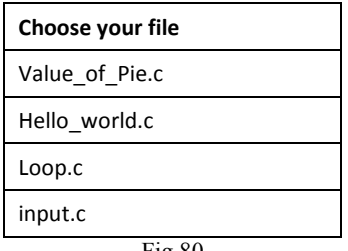


Fig 80

Touch the desired program.

The code is loaded and displayed in the text area.

Slide the text area (up and down) to view more code.

3.2) C++ Programming

Touch C++ icon, which will display "C++" programming console. This console is common for all four applications.

3.2.1) Text Area and Output Window

The programming console is divided into two parts, Text area(left) for writing codes, and console output(right) for displaying output of the program.

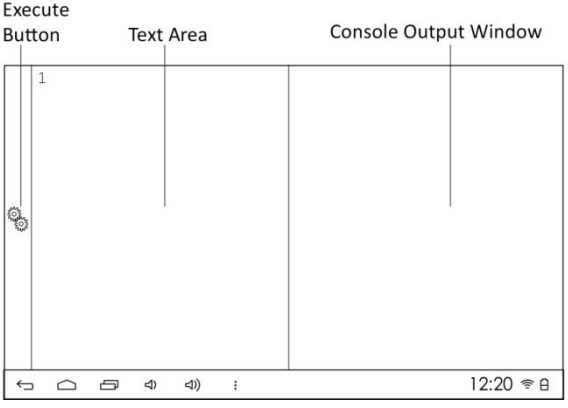


Fig 81

3.2.2) Load Examples

Touch Options button placed in the notification bar. A list of options is displayed.

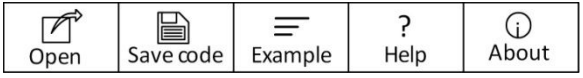


Fig 82

Touch Example Fig 83

A list of preloaded examples is displayed.

Choose your file
HelloWorld.cpp
Pointers.cpp
Roll_die.cpp
Polymorphism.cpp

Fig 84

Touch the desired program, e.g. "Roll_die.cpp".
The code is loaded and displayed in the text area.
Slide the text area (up and down) to view more code.

3.2.3) Execute

Write or load existing program.

Touch Execute button placed on the left.

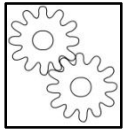


Fig 85

The output is displayed in the console output window.

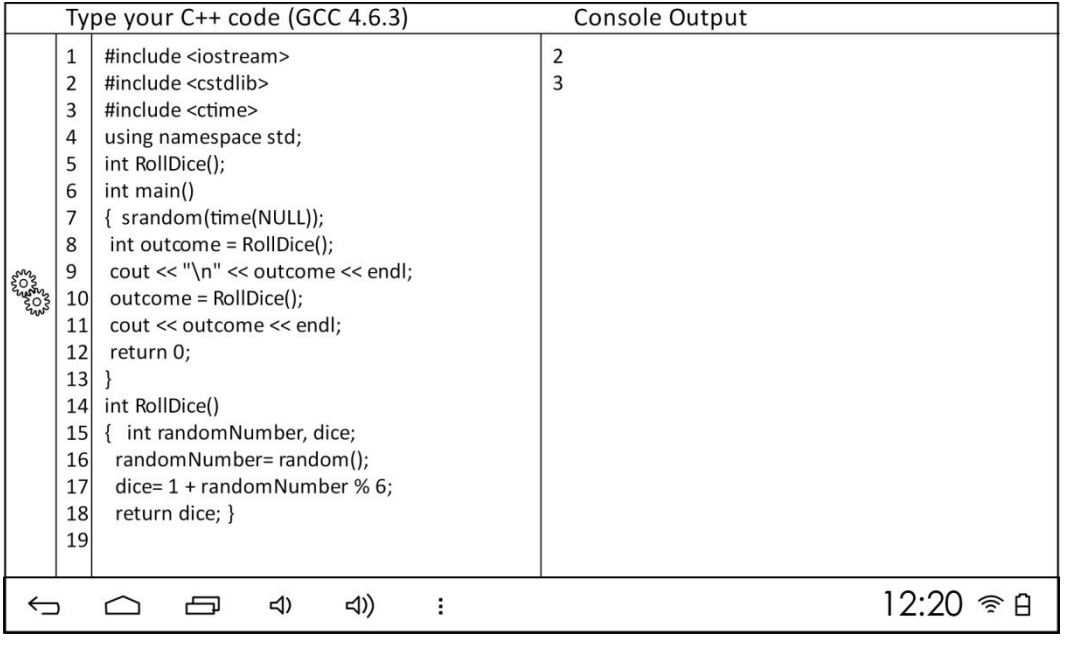


Fig 86

3.2.4) Write

Touch the text area to activate the android keyboard.

Refer the "Basic Manual" for operating the android keyboard.

Write the desired code. Touch the back button in the notification bar to minimize the keyboard

Fig 87

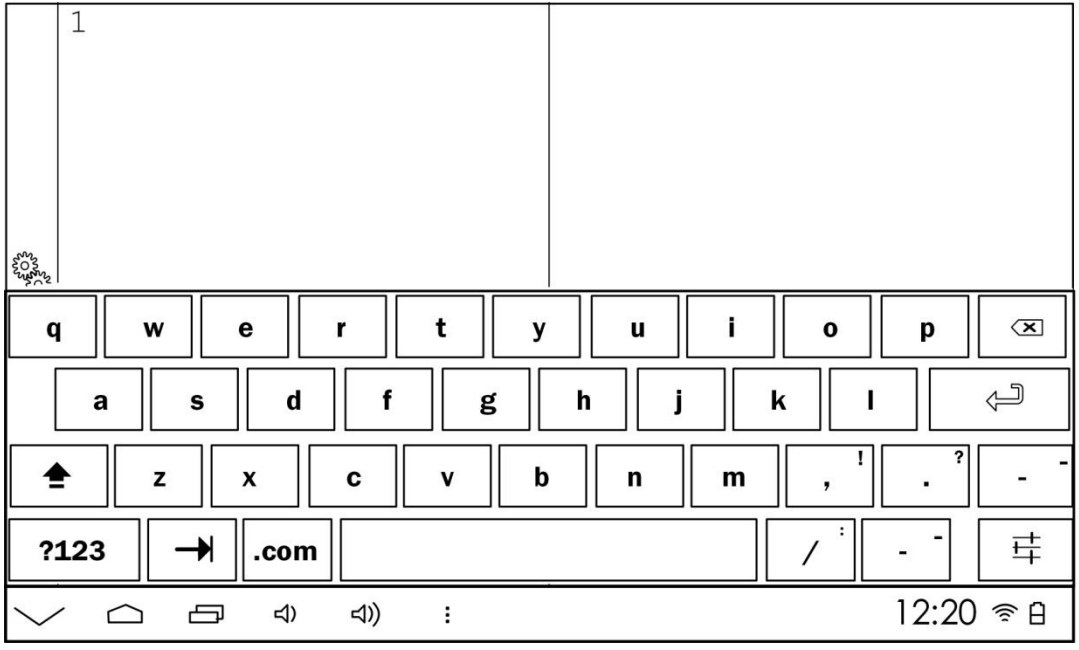


Fig 88

3.2.5) Save

Write the desired code.

Touch Options button placed in the notification bar. A list of options is displayed.

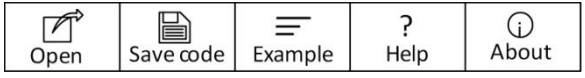


Fig 89

Touch Save Code.

Fig 90

An input box is displayed.

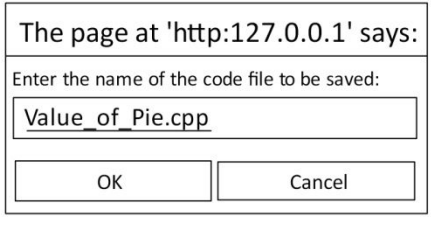


Fig 91

Write the desired name using the android keyboard.

Touch OK

3.2.6) Open

Touch Options button placed in the notification bar. A list of options is displayed.

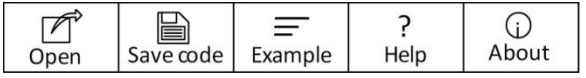


Fig 92

Touch Open

Fig 93

A list of saved programs is displayed.

Choose your file
Value_of_Pie.cpp
Pointers.cpp
Roll_die.cpp
Polymorphism.cpp

Fig 94

Touch the desired program.

The code is loaded and displayed in the text area.

Slide the text area (up and down) to view more code.

3.3) Python Programming

Touch Python icon, which will display "Python" programming console. This console is common for all four applications.

3.3.1) Text Area and Output Window

The programming console is divided into two parts, Text area(left) for writing codes, and console output(right) for displaying output of the program.

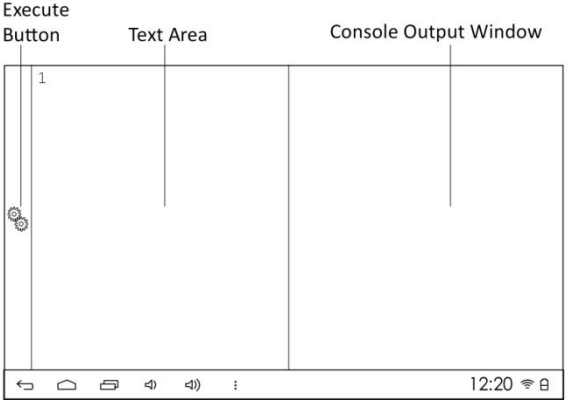


Fig 95

3.3.2) Load Examples

Touch Options button placed in the notification bar. A list of options is displayed.

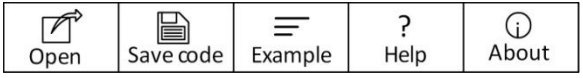


Fig 96

Touch Example Fig 97

A list of preloaded examples is displayed.

Choose your file
Value_of_Pie.py
Loop.py
HelloWorld.py
input.py

Fig 98

Touch the desired program, e.g. "Value_of_Pie.py".

The code is loaded and displayed in the text area.

Slide the text area (up and down) to view more code.

3.3.3) Execute

Write or load existing program.

Touch Execute button placed on the left.

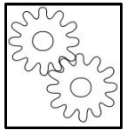


Fig 99

The output is displayed in the console output window.

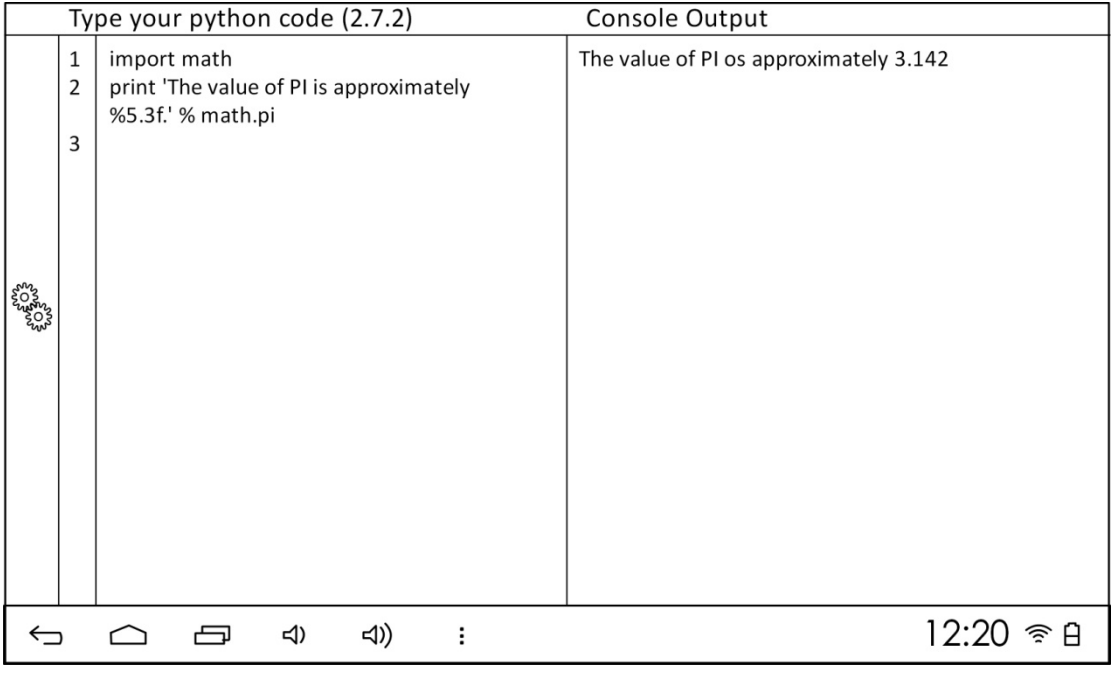


Fig 100

3.3.4) Write

Touch the text area to activate the android keyboard.

Refer the “Basic Manual” for operating the android keyboard.

Write the desired code. Touch the back button in the notification bar to minimize the keyboard

Fig 101

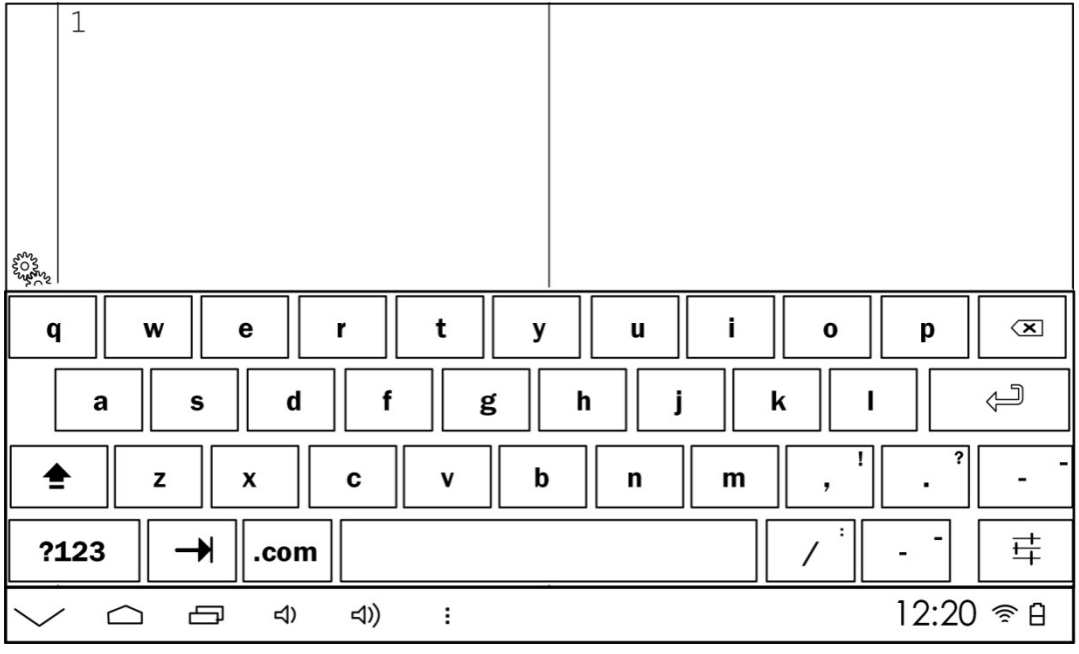


Fig 102

3.3.5) Save

Write the desired code.

Touch Options button placed in the notification bar. A list of options is displayed.

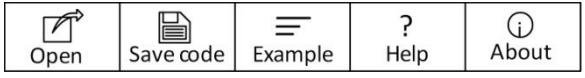


Fig 103

Touch Save Code.

Fig 104

An input box is displayed.

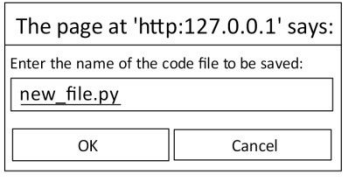


Fig 105

Write the desired name using the android keyboard.

Touch OK

3.3.6) Open

Touch Options button placed in the notification bar. A list of options is displayed.

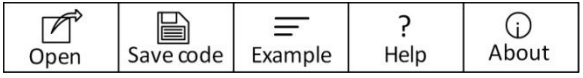


Fig 106

Touch Open

Fig 107

A list of saved programs is displayed.

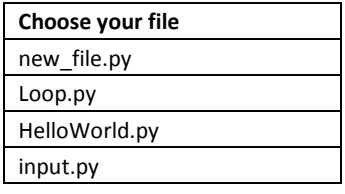


Fig 108

Touch the desired program.

The code is loaded and displayed in the text area.

Slide the text area (up and down) to view more code.

3.4) Scilab Programming

Touch Scilab icon, which will display "Scilab" programming console. This console is common for all four applications.

3.4.1) Text Area and Output Window

The programming console is divided into two parts, Text area(left) for writing codes, and console output(right) for displaying output of the program.

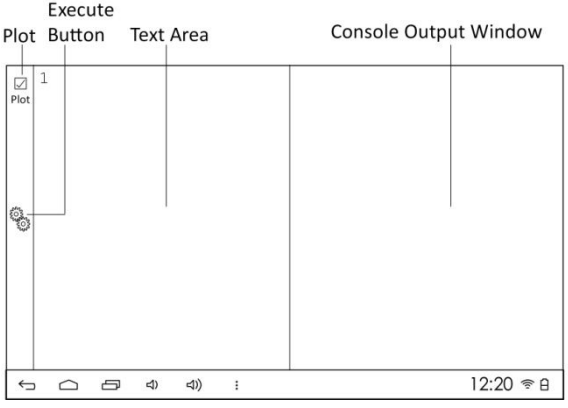


Fig 109

3.4.2) Load Examples

Touch Options button placed in the notification bar. A list of options is displayed.

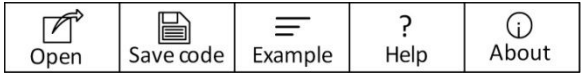


Fig 110

Touch Example

Fig 111

A list of preloaded examples is displayed.

Choose your file
sub_plot.cde
Grid.cde
Milk_drop.cde
Mesh.cde

Fig 112

Touch the desired program, e.g. "Milk_drop.cde".

The code is loaded and displayed in the text area.

Slide the text area (up and down) to view more code.

3.4.3) Execute

Write or load existing program.

Touch Plot option to get graphical output

Touch Execute button placed on the left.

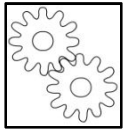


Fig 113

The output is displayed in the console output window.

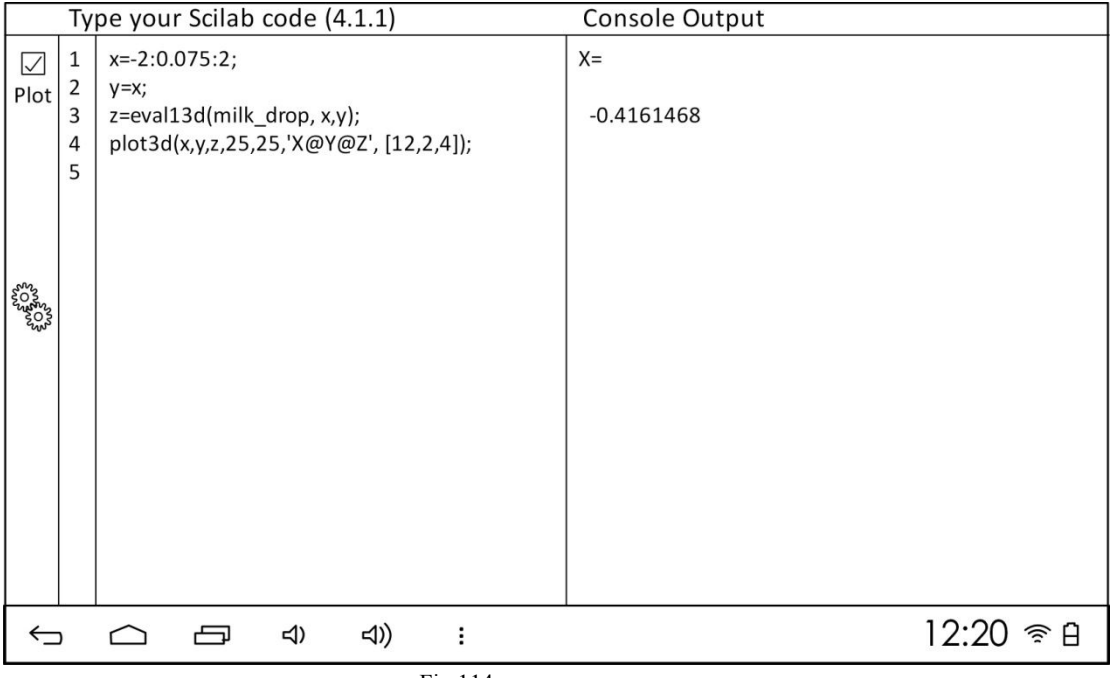


Fig 114

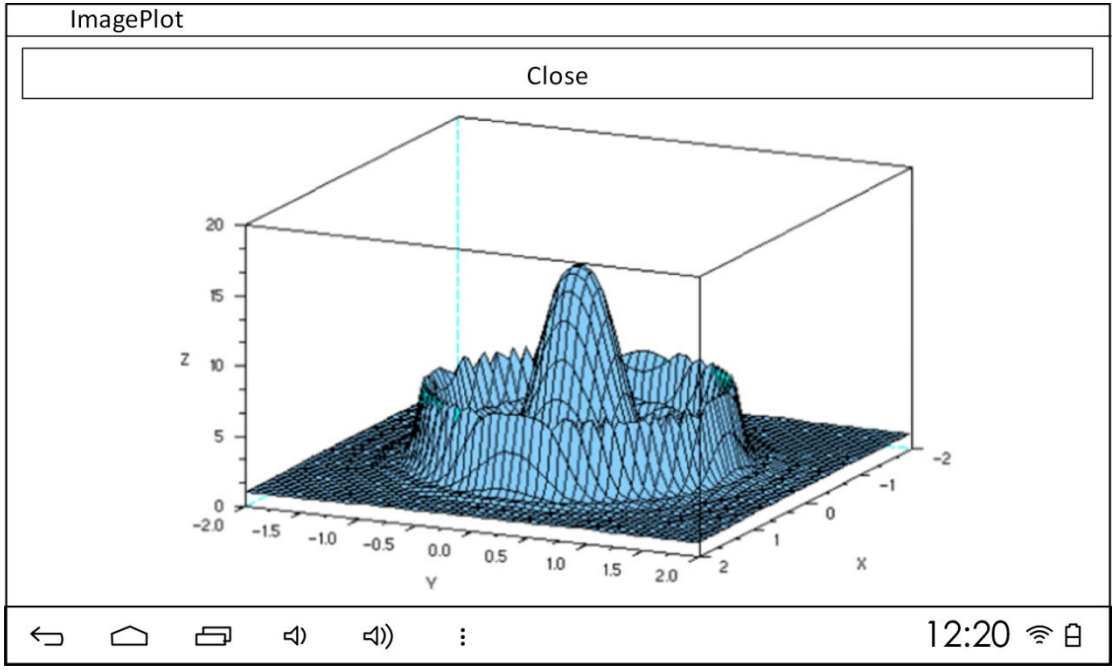

ImagePlot
Close
20
15
10
5
0
Z
-2.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
2.0
Y
2
1
0
-1
-2
X
12:20

Fig 115

3.4.4) Write

Touch the text area to activate the android keyboard.

Refer the “Basic Manual” for operating the android keyboard.

Write the desired code. Touch the back button in the notification bar to minimize the keyboard

Fig 116

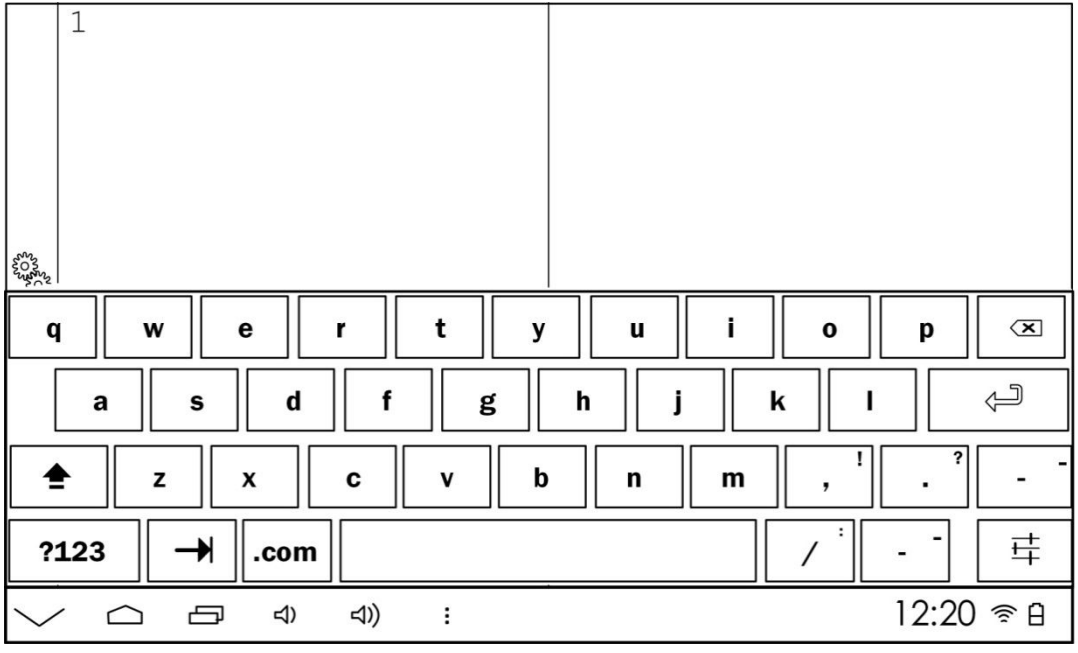


Fig 117

3.4.5) Save

Write the desired code.

Touch Options button placed in the notification bar. A list of options is displayed.

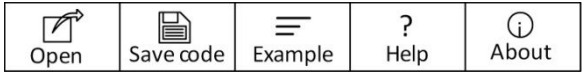


Fig 118

Touch Save Code.

Fig 119

An input box is displayed.

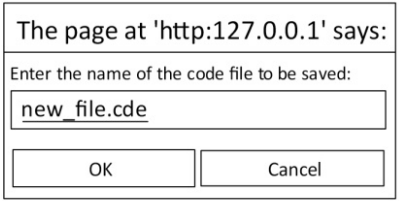


Fig 120

Write the desired name using the android keyboard.

Touch OK

3.4.6) Open

Touch Options button placed in the notification bar. A list of options is displayed.

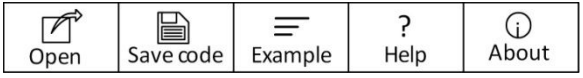


Fig 121

Touch Open

Fig 122

A list of saved programs is displayed.

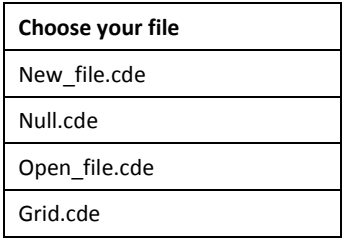


Fig 123

Touch the desired program.

The code is loaded and displayed in the text area.

Slide the text area (up and down) to view more code.

Notes(1)

Notes(2)

Notes(3)